

AMENDMENTS TO THE CLAIMS

1. (Previously presented) A pen input/display device, comprising:
an input pen enabling a pen input on a display panel;
infrared transmission means and ultrasonic transmission means provided on the input pen;

infrared receive means and at least two ultrasonic reception means, provided on the display panel, receiving an infrared signal and an ultrasonic signal simultaneously transmitted respectively from the infrared transmission means and the ultrasonic transmission means provided on the input pen, when a pen tip of the input pen is in contact with the display panel;
and

display control means computing a contact position of the pen tip on the display panel from a result, containing a time delay, of receiving the ultrasonic signal by the at least two ultrasonic reception means with reference to a time when the infrared receive means receives the infrared signal,

said input pen including pen pressure sensor means sensing pen pressure when the pen tip is in contact with the display panel; and pen pressure information infrared transmission control means controls the infrared transmission means to transmit an infrared signal which changes in accordance with the pen pressure, wherein

the input pen further includes sequence input means enabling inputs of a series of pen pressure levels in an order of frequency of use; and

the pen pressure information infrared transmission control means controls the infrared transmission means to change the infrared signal in accordance with frequency of use of individual pen pressure levels as sorted through the sequence input means.

2. (Original) The pen input/display device as set forth in claim 1, wherein the pen pressure information infrared transmission control means controls the infrared transmission means to transmit the infrared signal with varied pulse widths in accordance with the pen pressure.

3. (Previously presented) A pen input/display device, comprising:
an input pen enabling a pen input on a display panel;
infrared transmission means and ultrasonic transmission means provided on the input pen;

infrared receive means and at least two ultrasonic reception means, provided on the display panel, receiving an infrared signal and an ultrasonic signal simultaneously transmitted respectively from the infrared transmission means and the ultrasonic transmission means provided on the input pen, when a pen tip of the input pen is in contact with the display panel;
and

display control means computing a contact position of the pen tip on the display panel from a result, containing a time delay, of receiving the ultrasonic signal by the at least two ultrasonic reception means with reference to a time when the infrared receive means receives the infrared signal,

said input pen including pen pressure sensor means sensing pen pressure when the pen tip is in contact with the display panel; and pen pressure information infrared transmission control means controls the infrared transmission means transmit the infrared signal which changes in accordance with the pen pressure,

wherein the pen pressure information infrared transmission control means controls the infrared transmission means to transmit the infrared signal with varied pulse widths in accordance with the pen pressure, and

wherein:

the input pen further includes sequence input means enabling inputs of a series of pen pressure levels as sorted by frequency of use; and

the pen pressure information infrared transmission control means controls the infrared transmission means to transmit the infrared signal with pulse widths which grow longer in descending sequence of frequency of use of individual pen pressure levels as sorted through the sequence input means.

4. (Original) The pen input/display device as set forth in claim 1, wherein the pen pressure information infrared transmission control means controls the infrared transmission means to transmit at least two infrared pulses an interval between which changes in accordance with the pen pressure.

5. (Previously presented) The pen input/display device as set forth in claim 1, wherein the pen pressure information infrared transmission control means outputs multiple successive infrared signal pulses in accordance with the pen pressure.

6. (Original) The pen input/display device as set forth in claim 1, wherein the infrared signal represents bit data.

7. (Previously presented) The pen input/display device as set forth in claim 5, wherein:
the pen pressure information infrared transmission control means controls the infrared transmission means to transmit the infrared signal over infrared signal output periods which grow longer in descending sequence of frequency of use of individual pen pressure levels as sorted through the sequence input means.

8. (Previously presented) The pen input/display device as set forth in claim 6, wherein:
the pen pressure information infrared transmission control means controls the infrared transmission means to transmit the infrared signal over infrared signal output periods which grow longer in descending sequence of frequency of use of individual pen pressure levels as sorted through the sequence input means.

9. (Previously presented) A pen input device comprising:
an infrared transmitter transmitting an infrared signal for communicating with an infrared receiver associated with a display device;
an ultrasonic transmitter for communicating with an ultrasonic receiver associated with a display device;

a pen pressure sensor sensing pen pressure against a surface and producing a first output in response to a first sensed pressure level and a second output in response to a second sensed pressure level; and

a controller for controlling the infrared transmitter to produce a first signal when said first pressure level is detected and a second signal when said second pressure level is detected, said controller having a sequence input mode enabling inputs of a series of pen pressure levels in an order of frequency of use.

10. (Previously presented) In combination, an input pen and a display device, wherein:
the display device comprises an infrared receiver and at least two ultrasonic receivers;
and

the input pen comprises an infrared transmitter, an ultrasonic transmitter and a pressure sensor producing a signal related to a contact pressure between the input pen and the display device;

wherein the display device further includes a controller for determining a location of the input pen on the display device when the input pen contacts the display device based on infrared and ultrasonic signals received by the display device from the input pen; and

wherein the infrared transmitter sends a signal that varies with the sensed contact pressure between the input pen and the display device in a manner determined by a sequence input of a user.

11. (Previously presented) A method of transmitting a signal from an input pen to a display device comprising the steps of:

providing a display device having an infrared receiver and an ultrasonic receiver;

providing an input pen including an infrared transmitter for transmitting an infrared signal, an ultrasonic transmitter for transmitting an ultrasonic signal, and a pen pressure sensor sensing pen pressure against the display and producing a pressure signal related to pen pressure against the display;

transmitting an infrared signal and an ultrasonic signal when the input pen contacts the display;

determining a location of pen contact on the display from the infrared signal and the ultrasonic signals; and

varying the infrared signal in response to a user input related to a frequency of use of pressure levels and in response to changes in pen pressure against the display.

12. (Previously presented) The method of claim 11 wherein said step of varying the infrared signal in response to changes in pen pressure against the display comprises the step of varying a pulse width of the infrared signal.

13. (Currently amended) A method of transmitting a signal from an input pen to a display device comprising the steps of:

providing a display device having an infrared receiver and an ultrasonic receiver;

providing an input pen including an infrared transmitter for transmitting an infrared signal, an ultrasonic transmitter for transmitting an ultrasonic signal, and a pen pressure sensor sensing pen pressure against the display and producing a pressure signal related to pen pressure against the display;

transmitting an infrared signal and an ultrasonic signal when the input pen contacts the display;

determining a location of pen contact on the display from the infrared signal and the ultrasonic signals; and

varying the infrared signal in response to a user input related to a frequency of use of pressure levels and in response to changes in pen pressure against the display;

~~The method of claim 11~~ the method further including the additional steps of:

establishing a series of pen pressure levels;

ordering the pen pressure levels based on frequency of use; and

associating each of the pen pressure levels with an infrared signal pulse width such that a more frequently used pen pressure level has a shorter pulse width than a pulse width of a less frequently used pen pressure.

14. (Previously presented) The method of claim 11 wherein said step of varying the infrared signal in response to changes in pen pressure against the display comprises the step of varying an interval between two infrared pulses in response to changes in the pen pressure against the display.

15. (Previously presented) The method of claim 11 wherein said step of varying the infrared signal in response to changes in pen pressure against the display comprises the step of varying the infrared signal to transmit bit data.